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to enlarge its activity in establishing anthropology on a firmer basis. Although, therefore, the establishment of close relations between all individuals all over the country who are interested in anthropology seems to be of great importance, the reserving of an opportunity for discussion among scientists alone must not be lost sight of. At the present time the number of trained anthropologists is so small that it is doubtful if there is any immediate necessity of providing for such meetings. A conservative estimate of the number of anthropologists who can lay claim to a fairly symmetrical training, and who contribute to the advance of anthropology, would hardly exceed thirty. At the same time the number of young men who devote themselves to this science is constantly increasing. Harvard, Columbia and Chicago universities are constantly training new men, and the breadth and thoroughness of their training are constantly increasing. If therefore the time is not ripe for providing for strictly technical meetings, it is certainly not far distant. In most sciences the organizations which are providing for technical meetings, and those which provide for the general interest of the science, have become distinct organizations. I have hinted before at the reason which led to this condition of affairs. The foundation of societies of specialists was partly a reaction against the popular character of the meetings of the older societies. The experiences of the last few years seem to suggest that a separate organization gives a better assurance of preserving the purely scientific character of meetings than attempts to distinguish between two kinds of meetings of the same society—technical meetings and popular meetings—orthrough the division of the membership of a society into two classes, as fellows and members. Nevertheless it is not certain that adequate provisions for technical meetings might not

be made in the general society. I wish to call attention here to the methods of scientific societies abroad, many of which have also a miscellaneous membership. The scientific work of these societies is carried on successfully, notwithstanding the presence of lay members, and the success of such meetings depends simply upon the courage of the presiding officer, and of the speaker to discuss before his audience technical matters which may be beyond the comprehension of a majority of the audience. I do not venture to say whether an attempt of this kind could be successful here.

I believe the reasons that have been adduced, and which have been much discussed among a number of anthropologists, are weighty enough to induce us to consider carefully if the time has come for a better organization of anthropological work all over the country, and what steps may be the most advantageous to take.

FRANZ BOAS.

*EXCERPTS FROM THE REPORT OF THE
CENSUS COMMITTEE OF THE AMERICAN
CHEMICAL SOCIETY.*

THE Census Committee of the American Chemical Society sought to learn as accurately as possible the progress during the last twenty-five years, and how to better the conditions for the development of chemistry in America. A mere statement of the conditions without further comment would hardly secure that end. It was therefore necessary to gather statistics of the most varied character. Naturally such a report could not be complete, as the members of the committee had various other cares demanding their attention, and the means at their command were limited. Sufficient data, however, were secured to give cause for some gratification and at the same time to indicate directions for much home mission work among American chemists. This

article, in brief, must merely state a few points of interest dealt with more in detail by the committee. Over two hundred colleges, including the leading universities of the United States, gave the committee statistics. Scarcely a dozen answers came from Canada and no requests for information were sent to Mexico.

A lengthy table is given showing the increase in the number of students in chemistry (inorganic, organic, physical and agricultural) during the past twenty-five years. While the figures are not to be relied upon for several reasons, some very interesting information was gained; for instance, there is a very marked number of students specializing in chemistry; the courses have been much diversified by means of the increase in the number of instructors, teaching fellows, laboratory assistants, etc.

In regard to equipment: Large sums have been spent by many institutions, some having even been established since the founding of the American Chemical Society. A few chemical departments reported large endowments. While in many cases through private beneficence institutions have been provided with commodious and in some instances magnificent laboratories, as at Yale, Columbia, Chicago, Cornell and Leland Stanford, Jr., and in others, as the Universities of Nebraska and Washington, the states have supplied the needs in many departments, there is still a crying demand for better equipment and better accommodation. Some few reported their equipment as sufficient.

While much information in regard to buildings, floor-space, etc., was secured, an itemized statement of such was impracticable. A conservative statement, averaging all, is that the accommodations for students, teachers and chemists in America have increased in the proportion of one to twenty-five.

Two interesting tables are included in the report touching directly upon the number of professors teaching *organic chemistry*; the number of students taking lecture work in organic chemistry, laboratory work in organic chemistry; and the number of professors, instructors and students doing research work in organic chemistry. It appears almost beyond conception to realize that in only five or six colleges were researches in organic chemistry conducted in 1876, while now over thirty institutions offer excellent opportunities for such researches and the total number of students carrying them out in these institutions is much over a hundred (1900). Twenty-five volumes of the *American Chemical Journal* speak eloquently of American researches in organic chemistry. (Report on Organic Chemistry was prepared by W. A. Noyes.)

The report contains a complete history of the development of *physical chemistry* in America (by Louis Kahlenberg). At the founding of the Chemical Society there was not a single instructor of physical chemistry in America. In fact it may be said that this phase of the subject has been recognized only within the last decade, yet at present there are several chairs of physical chemistry in America, and all of the more important institutions offer instruction in that subject under an adjunct professor or instructor in charge of it. An outline is given also of the aspirations and aims of physical chemistry in America, and a promising indication of accomplishment is had in the *Journal of Physical Chemistry*, now in its fifth volume.

Agricultural Chemistry (by C. L. Parsons).—The report in reviewing agricultural chemistry has considered the establishment of many of the agricultural colleges a few years preceding the founding of the Society. Not long afterward, in 1882, the Association of Official Agricultural Chemists, which has done and

is doing so much for securing standard and satisfactory analytical methods, was organized. The Experiment Stations established in 1887, the present Soil Surveys and finally the establishment of a division of chemistry in the department of agriculture are simply cited as marks of progress. Although full courses of chemistry are given at all of these land-grant colleges, many of which have some of the very best equipped laboratories and offer the most extensive election of work in chemistry, the total number of agricultural chemists or students taking agricultural chemistry is proportionately small (1,555). A full table is given showing the proportion of students in all courses in these state colleges who receive instruction in chemistry, proportion of students in agricultural courses who receive chemical instruction, with special reference to agricultural products, plant life, fertilizers, etc.

Industrial or Technical Chemistry.—In considering that phase of the subject the committee had to consider it from two standpoints: first, the amateur; and second, the professional.

In regard to the former a quotation from Priestley's 'Essay on Education' is fitting: 'It seems to me a defect in our public course of education that a proper course of study is not provided for gentlemen who are to fill the greatest stations of actual life distinct from those who are adapted to the learned professions.' With this was taken a course of lectures in industrial chemistry—really economics, chemically considered—as offered in many institutions.

In regard to the second class, professional chemists, George Hamilton, in writing to Sir Alfred Hickman, ex-president of the British Iron Trade Association, among other things said: 'Chemical research, concentration of capital, thorough technical education, improved industrial organizations have made, within recent years,

greater advance in America than here.'—*Nature*. The most timely address of the retiring president, Wm. McMurtrie, was referred to.

The rapid growth of chemistry has naturally developed undesirable phases, some beyond help, but others that may be corrected:

First, there has been a tendency to permit many students to specialize before the proper foundation had been laid. The result has been the making of mere analysts and not chemists.

The second, in a measure dependent upon the first, may be stated in the words of one of the respondents: 'It seems that chemists are underpaid; while a furnace-man gets from \$150 to \$300 per month, the chemist gets about \$50 to \$100 per month.'

Third, according to another respondent: 'Our country is a long way behind the times in the matter of cooperation between manufacturers and universities.'

Fourth, there is a notable percentage of chemists, practical and teaching, especially the latter, who are not members of any chemical society, according to the latest official registers of Germany, England and America.

Fifth, the Chemical Society ought to take some steps to set the seal of approval for all graduates in first-rate chemical courses and to disapprove of self-made and half-made chemists.

A very encouraging state of affairs was observed in regard to the increase in the number of members of the American Chemical Society. Yet it is noticeable that teachers in many of the smaller institutions, and assistants and fellows in the larger ones, have not allied themselves with any chemical society. Suggestions were offered and steps have already been taken, whereby this, in a measure, can be remedied.

Very interesting and gratifying infor-

mation was secured showing that while a larger number of students seek the degree of Doctor of Philosophy in Europe now than in 1876, the percentage is vastly less. The small institutions reported almost unanimously that their students sought the larger American universities for their final work, at the same time the great home institutions reported that many of the best men still seek instruction abroad after having secured the American degree. The German degree does not possess, compared with the American, the same financial value it held in 1876.

It was learned, and regretted, that as yet there is little exchange of graduate students for a term or so among American universities. Finances, arrangements of terms, required residence and competition for students are factors that interfere with the accomplishment of this desired end, which will doubtless shortly be solved for chemists in the larger movement afoot.

A statement of the new fields in which chemistry has been recognized as a necessary factor is mentioned in the report, but it was learned that the appreciation of chemistry and its application has not been uniform throughout the country by any means. It is a fact, easily established, that those sections which have been most progressive or have grown most rapidly utilize most extensively the services of chemists. This is largely, however, an economic problem, for twenty-five years ago profits were immense and wastes enormous; now with competition, local and foreign, the value of waste is appreciated and chemistry regulates the control of that waste. One informant wrote: 'Twenty-five years ago I do not think there was a practical chemist in the whole Northwest; there are now fifty men employed in the Twin Cities.'

Certain sections of the country, beyond question, need awakening. The teacher

should, and would, do great service by throwing out suggestions as to what and how it is done in other sections than the one in which he lives. Dr. J. Lawrence Smith said: 'We should do our full share in developing industrial chemistry,' and according to the address of one of our recent presidents: 'The pure and applied are interdependent and retro-stimulating.'

One of the defects noted by certain manufacturers in sections where chemists are appreciated is that oftentimes graduates have gone to them claiming a skill they did not possess. A student should have better preliminary preparation, more time in college and more inducements for graduate work. Financial aids offered students wishing to specialize in chemistry are more numerous and valuable now than in 1876. This assistance is secured in the form of appointments to fellowships, scholarships, etc., the emoluments, usually, for such services being from free tuition and laboratory fees to \$600 per year.

Educational institutions still find it advantageous to import many chemicals and much apparatus. America produces heavy chemicals as pure and, considering the cost of transportation, etc., as cheap as the foreign manufacturers, but as yet little attempt is made by the American manufacturer to produce the finer organic preparations. This is due to several important factors, some concerned with legislation as, for instance, untaxed alcohol, tariff, patent laws, etc. The committee did not attempt to furnish statistics and information in regard to the chemical manufacturer, as one member of the committee (C. E. Munroe) is the Expert Special Agent of the Twelfth United States Census in charge of that subject, and is preparing a lengthy report which will be published in due time by the government.

Satisfactory machinery for all kinds of manufactures can be secured from domes-

tic sources; it therefore appears that the heavier pieces, like iron ware, electrochemical apparatus, platinum ware, etc., are to be had economically in America. For the more delicate and stable glassware, however, it is quite necessary to import. Manufacturers have noticed the tendency to favor home-produced goods, and advertise thermometers, porcelain ware, etc., 'Made in the United States.' They deserve encouragement, but buyers are not inclined to pay too liberally for their patriotism.

While some very excellent American balances are made, the prices placed upon the same are high. It is claimed that American glass is inferior to German in quality and power of resistance to chemicals, and further there is much criticism of some dealers for substituting inferior goods. This is a clear business proposition, which offers an easy solution, but oftentimes serious inconvenience is caused by institutions and chemists located great distances from the distributing points. The most promising encouragement for instruments of accuracy in home-made goods is offered in the recent establishment of the National Standards Bureau, in the accomplishment of which members of the American Chemical Society took an active part.

A larger proportion of chemical students are turning their attention to pharmacy, a most desirable state of affairs. Progress is shown in that line by the many excellent and some bad preparations coming from the drug houses. It is unfortunate, however, that the examination boards of pharmacy in some states are too lax in their requirements for license.

Teaching of Chemistry in the Schools.—At the request of the Committee Mr. Rufus P. Williams, of the English High School, Boston, prepared a very instructive history of the teaching of chemistry in the schools, 1876 to 1901 (already published

in SCIENCE). A careful study of the subject by student and teacher is urged. It is most important that they organize an association of science for chemistry teachers in various parts of the country, as has been done, with excellent results, by the New England teachers.

With very rare exceptions all institutions, offering courses in chemistry insist upon complementary laboratory instruction, which was not the case in 1876 (see Clarke's Report, Department of Education, 1880). Information from the smaller colleges, purely academic in character, shows that they now usually have a short required course in chemistry. In 1876 a meager course, usually of lectures, was required; now the subject is elective, accompanied with laboratory practice, in the larger institutions.

There is great room for improvement in the smaller colleges along two lines:

1. Employment of men especially trained to teach the subject. It is well known that men holding the degree of Master of Arts have been employed to teach in some of the small colleges, their work frequently being assigned to them after their arrival. This is an evil and an injustice to science, more widespread than is imagined, and one which can be corrected, and is being corrected, without financial loss to those institutions.

2. This may be illustrated by the statement of one teacher and needs no comment: "Most chemists in institutions like ——— college—and other denominational schools are overburdened with other duties. For example, the undersigned has to teach algebra, geometry, trigonometry, analytic geometry, calculus, physics, botany, zoology, astronomy, physiology, manager of the college monthly, publications, etc., besides teach chemistry."

There are very few of the larger universities offering courses in advanced inorganic chemistry, such as are given at Cornell. Such

work is offered as a rule rather under the head of research than in grouped lectures. Presentation of general chemistry to younger students is not now confined apparently to the old routine, but to an outline, based more upon the periodic system or the variations of it, so that the subject is exhibited more in detail and as a unit and in less time.

Within the past twenty-five years there has been a most gratifying progress in teaching medical students chemistry. Full appreciation of chemistry by doctors of medicine has not come about through such a vigorous reformation as advocated by Paracelsus. Bacteriological side-lights have illuminated the path. In addition to the usual lectures on chemistry, laboratory work is universally required and the best medical schools demand attendance on lectures on physiological chemistry, and personal experimentation with many of the products of animal metabolism. (See Vice-President Long's address before Section C, A. A. A. S., Denver Meeting, 1901.)

C. B.

MEMBERSHIP OF THE AMERICAN ASSOCIATION.

THE following have completed their membership in the American Association for the Advancement of Science during the month of April:

H. Jerome Allen, M.D., 421 H Street, N. E., Washington, D. C.

Edwin C. Anderson, M.D., 726 Market Street, Chattanooga, Tenn.

Ralph Arnold, Instructor in Mineralogy, Stanford University.

C. A. Ballard, State Normal School, Moorhead, Minn.

Carl Beck, M.D., 37 East 31st Street, New York, N. Y.

L. Napoleon Boston, M.D., 1531 South Broad Street, Philadelphia, Pa.

Geo. S. Brown, M.D., 2220 First Avenue, Birmingham, Ala.

Glenn V. Brown, Teacher of Science, Bradford, Pa.

Herbert L. Burrell, M.D., 22 Newbury Street, Boston, Mass.

John C. F. Bush, M.D., Wahoe, Nebraska.

Owen Byrnes, Mining Engineer, P. O. Box 131, Marysville, Montana.

Frederick G. Clapp, Geologist, 169 Boston Street, South Boston, Mass.

H. A. Coffeen, Sheridan, Wyoming.

W. F. Cole, M.D., Waco, Texas.

T. Shields Collins, M.D., Globe, Arizona.

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Richard D. Coutant, M.D., Tarrytown, N. Y.

Roys J. Cram, 26 Hancock Avenue, West, Detroit, Mich.

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F. G. Du Bose, M.D., 915 Alabama Street, Selma, Ala.

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Junius R. Flickinger, Principal of Normal School, Lock Haven, Pa.

Charles J. Fox, M.D., Lock Box A, Willimantic, Conn.

Free Library of Philadelphia, 1217-1221 Chestnut Street, Philadelphia, Pa.

Harry Friedenwald, M.D., 1029 Madison Avenue, Baltimore, Md.

Samuel H. Friend, M.D., 141 Wisconsin Street, Milwaukee, Wis.

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J. W. Gore, Professor of Physics, University of North Carolina, Chapel Hill, N. C.

George M. Gould, M.D., 1631 Locust Street, Philadelphia, Pa.

Wm. A. Guthrie, M.D., Franklin, Ky.

Wm. E. Guthrie, M.D., Bloomington, Ill.

Fred. C. Hall, Jr., M.D., Cuba, Kansas.